A19.1. No collapse by conscious perception.

Basic equations of quantum mechanics over-ruled

In this conjectured method of collapse, the wave function stays uncollapsed until a human observer perceives the result, in which case collapse to one version of reality occurs. (Because the human observer has this property and 'devices' don't, this assumes the human is essentially different from devices.) So Schrödinger's cat is both dead and alive until 'consciously' observed by someone. But there are, in my view, major problems with this conjectured interpretation. The first is that, as we said in Ch. 19, there is no evidence for this (or any other) type of collapse. The second is that, because the equations of motion of conventional quantum mechanics do not alter the magnitudes of the coefficients $a(1)$ and $a(2)$ in the half-silvered mirror experiment for example), the act of observation must countermand those equations in a very specific, mathematical way (one coefficient goes to 1, the others go to 0). This over-ruling of the mathematical equations by 'conscious' perception simply doesn't seem acceptable to me.

Probability law?

The third problem has to do with the probability law. How would collapse by conscious perception lead, after many runs of an experiment, to the $|a(i)|^2$ probability law?

Renninger experiment.

The final problem involves a variation of the Renninger experiment [1]. Do a Stern-Gerlach experiment (A6.1) on spin ½ silver atoms, with the source emitting atoms *randomly* at intervals of approximately 10 seconds. The atoms in the – ½ state travel on one path and are detected by a nearby detector while the atoms in the + ½ state travel on another path and are detected by a more distant detector, with the difference in flight times between the two detectors being, say, .01 seconds. The observer sees only the reading of the – ½ detector. The + ½ detector has no visual readout, but it has an alarm that goes off 1 second after detecting a silver atom.

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          Obs                Source                                Delayed alarm
—1/2   Det———t sec——*————t+.01 sec——————Det   +1/2
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When the alarm goes off, indicating detection on the + ½ path, the – ½ branch of the wave function must have been collapsed (because it wasn't observed) for 1.01 sec. But the observer *perceived nothing* before the alarm went off, so *the observer's perceptions could not have caused the wave function to collapse*. This simple reasoning, along with no rationale for the probability law, appears to definitively rule out collapse by conscious perception.

Reference.

[1] Mauritius Renninger, Zeitschrift fur Physick, 136, 251 (1953); 158, 417 (1960).